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Force Measurements on a Body Tail Combination at Different Reynolds Numbers and Roll Angles upto Incidences of 45°

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Abstract :

A detailed test program has been established in order to investigate the complicated vortex flow fields on bodies of revolution in combination with lifting surfaces at high incidence and at various Reynolds numbers. The aim of this research work is to understand the physics of flow and to create a data base for the validation and improvement of theoretical prediction methods. This report covers only a small part of the whole test program which was feasible during the first author's very short research visit at DFVLR. For that reason mainly the results are documented and the analysis of the data is yet incomplete. The first configuration investigated consists of a tangent ogive nose and a circular cylinder with a planar tail control of two diameters span. The tests have been carried out in the pressurised low speed wind tunnel of the DFVLR/AVA in Goettingen. The force and moment data have been obtained at medium angles of incidence, at different roll positions and at both transitional and turbulent Reynolds numbers. The influence of these parameters on the normal (inplane) and side (out-of-plane) forces were studied. The results are presented in the form of plots.